Lesson Notes 7-6 **Confidence Intervals**

A confidence interval is a range in which a polled or surveyed value, x, is predicted to lie. A confidence interval has the form:

$$x \pm \text{margin of error}$$

where the margin of error is usually expressed as a percent.

A confidence interval is used to make predictions about a population, based on samples from the population.

A confidence interval is affected by the margin of error and sample size:

- If the sample size stays the same, the margin of error increases as the confidence level increases.
- If the confidence level stays the same, the margin of error decreases as the sample size increases.

Example 1: A telephone survey of 500 randomly selected people was conducted in an urban area. The survey determined that 35% of Canadians from 24 to 45 years of age have an electronic book reader. The results are accurate within plus or minus 5 percent points, 19 out of 20. The number of people in this age range in Canada in 2011 was approximately 8.7 million. It is assumed that the ages are normally distributed.

a) What range of people own an electronic book reader? (confidence interval)

margin of error

$35\% \pm 5\%$

$8.7(0.35) \quad 8.7(0.05)$

3.045 ± 0.44

$3.045 + 0.44 = 3.485$

$3.045 - 0.44 = 2.605$

b) Determine the certainty of the results. (confidence level)

$\frac{19}{20} \times 100 = 95\%$

c) How many people would you expect to own an electronic book reader, based on this survey's results?

$35\% \pm 5\%$ ← from survey

$500(0.35) \quad 500(0.05)$

175 ± 25

$175 + 25 = 200$

$175 - 25 = 150$

Pg 274 #1-4 not 2b